

# Improving Blood Pressure Control Through Blood Pressure Measurement in an Ambulatory Urban Family Medicine Clinic

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## Background

### Nationally

- High blood pressure (BP) affects 108 million Americans
- Only 40% of patients with hypertension (HTN) achieve BP control
- For many patients, the first BP measurement taken during an office visit is higher than subsequent measurements: 35% of people with a first BP measurement >140/90 ultimately had an average BP <140/90 mm Hg when the average of 3 measurements was used
- The 2017 American College of Cardiology/American Heart Association Clinical Practice Guideline on High Blood Pressure recommends measuring BP  $\geq 2$  times during a clinic visit

### Jefferson Family Medicine Associates (JFMA)

- At baseline, 42% of our patients with HTN age >18 had uncontrolled BP >140/90
- An initial chart review over 18 months at JFMA in 2018 revealed a low rate of repeat BP measurements with only 55% of patients with elevated BPs having their BP rechecked.
- 15% of patients in the initial data search with HTN were found to have a normal BP when the measurement was repeated.

## Methods

### General

- We aimed to improve BP control in patients with HTN in our practice between 8/2019 and 4/2020.
  - Exclusion criteria: age <18, pregnant
- We identified a need to improve education to providers and medical assistants (MAs) about repeating BP measurements during clinic visits.
- We created three interventions to improve measurement and documentation of repeat BPs in our clinic, with the goal to improve accuracy of BP measurement.

### Interventions

- 1) 9/1/2019-11/1/2019: Educate providers/MAs to document repeat BP through lecture format
  - Providers: reviewed the importance of checking a second BP and how to document in Epic
  - MAs: held an in-service training reviewing BP measurement technique
- 2) 11/1/2019-1/1/2020: In-room reminder
  - We placed in-room reminders on the BP cuffs to remind all staff to recheck BPs.
- 3) 1/1/2020-3/1/2020: Omron HEM 907 BP cuff
  - BP was measured using the Omron HEM 907 on all patients with HTN. The patient would have three BP measurements taken and the average of the three BPs documented by the MA.

### Data Collection

- At the end of each intervention, we measured the percent of patients with BP controlled <140/90 using Qlik
- Residents performed a chart review for all patients with HTN seen in our clinic after 1/2020. We recorded if a repeat BP check was documented, if the patient's elevated BP was taken while the patient was at JFMA, and whether the patient's medications were changed.

A. An initial EPIC data search spanning an 18-month period of office visits revealed a very low rate of repeat blood pressure measurements in hypertensive patients with readings of 140/90 mm Hg or greater

Patients with at least two BP readings after abnormal reading	474
Patients with at least one BP reading after abnormal reading	1,063
Unique Patient Count	1,917
% of Patients with at least two BP readings after abnormal reading	24.70%
% of Patients with at least one BP reading after abnormal reading	55.50%
Patient Encounters where a secondary BP reading was Normal	147
Patient Encounters with More than One BP reading	951
% of Encounters where a secondary reading was normal	15.50%

B.

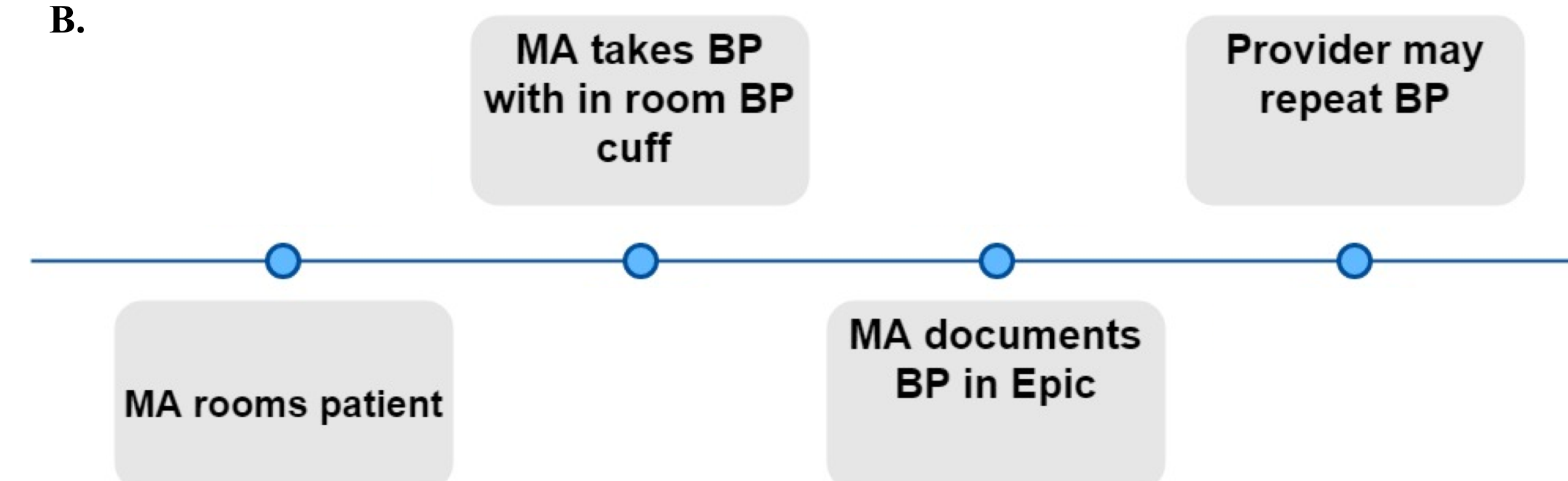


Figure 1  
A: Baseline Data for repeat BP measurement in JFMA office  
B. Flow diagram for repeat BP measurement (Interventions 2 and 3))

## Results

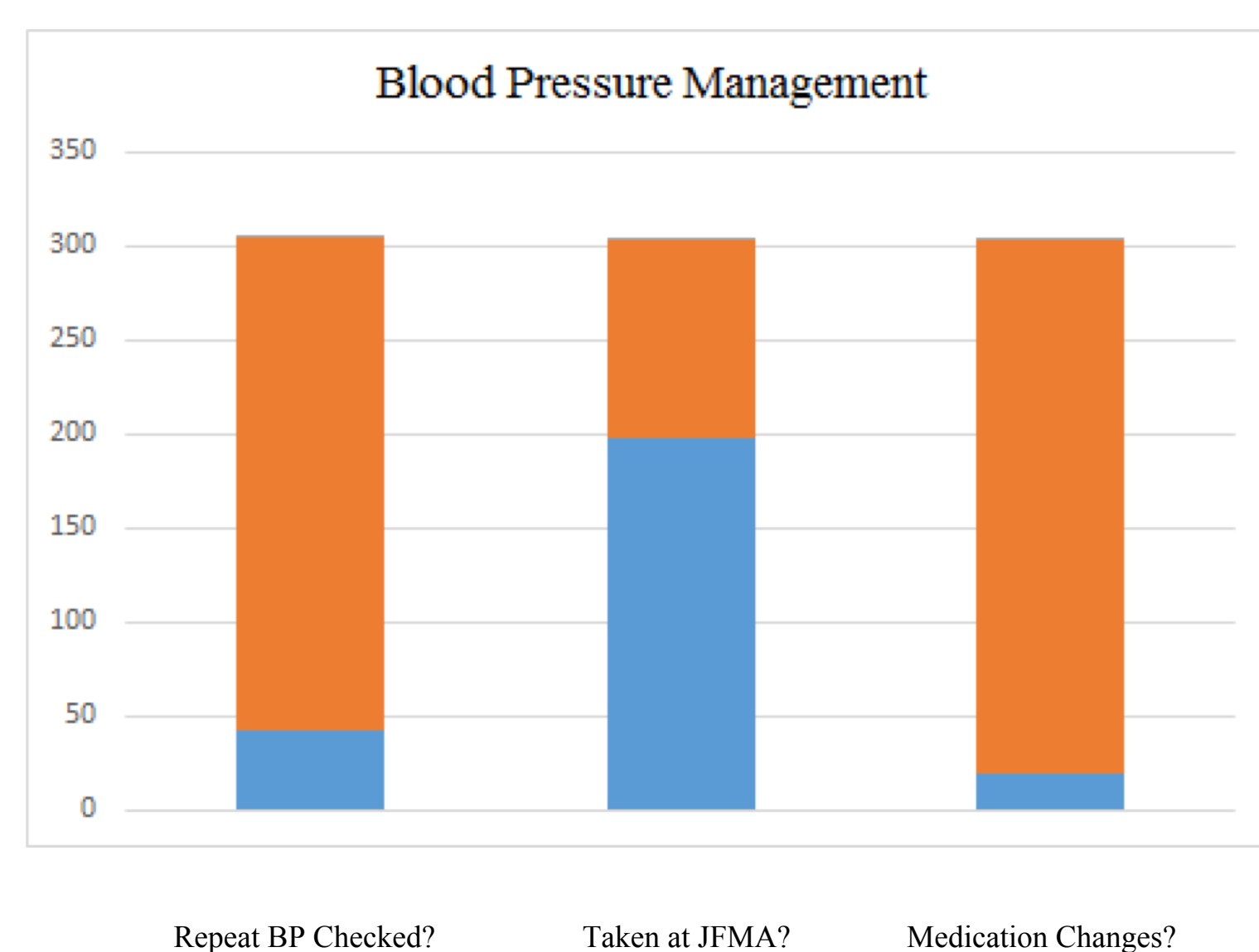


Figure 2. Primary outcomes for hypertensive patients (#) seen at JFMA (blue = yes, orange = no).

Table 1. Patient Demographics.

Patient Demographics	Number (%)
Male	100 (33%)
Female	204 (67%)
Age 18-65	212 (70%)
Age >65	92 (30%)

- Patient demographics displayed in **Table 1**. 33% (99/304) of patients with HTN had BP >140/90.
- **Results (Figure 2):**
  - 14% of all patients with HTN had a repeat BP documented
  - 65% of patients with HTN had their last BP measured at JFMA. 35% of patients' BP was measured in other settings (specialist office, emergency department, urgent care).
  - Only 7% of patients had BP medication changes made during their appointment.
- 22% (22/99) of patients with elevated BP at a JFMA visit had a repeat BP checked. Between 8/2019 and 4/2020, overall practice BP control decreased from 58% to 55%.

## Aim Statement

**To increase the percentage of patients over the age of 18 with BP controlled to a goal of <140/90 from a baseline of 58% to 68% by April 2020.**

## Discussion

- We did not achieve our aim. BP control at JFMA decreased from 58% to 55% between 8/2019 and 4/2020, coinciding with fewer office visits during COVID-19 pandemic.
- Implementation proved difficult; only 14% of hypertensive patients had repeat BPs documented. This could be due to staff not documenting repeat BPs.
- 35% of elevated BPs were measured in settings other than our office, often the emergency department during acute illness, decreasing our ability to control BP by definition.
- Providers often do not make medication changes for patients with elevated BPs, with the most common documented reason being medication nonadherence.
- Data gathering and results were limited by our ability to only analyze 304/600 charts.
- Future interventions include supplying hypertensive patients with home BP cuffs and scheduling weekly telemedicine appointments to titrate medications.

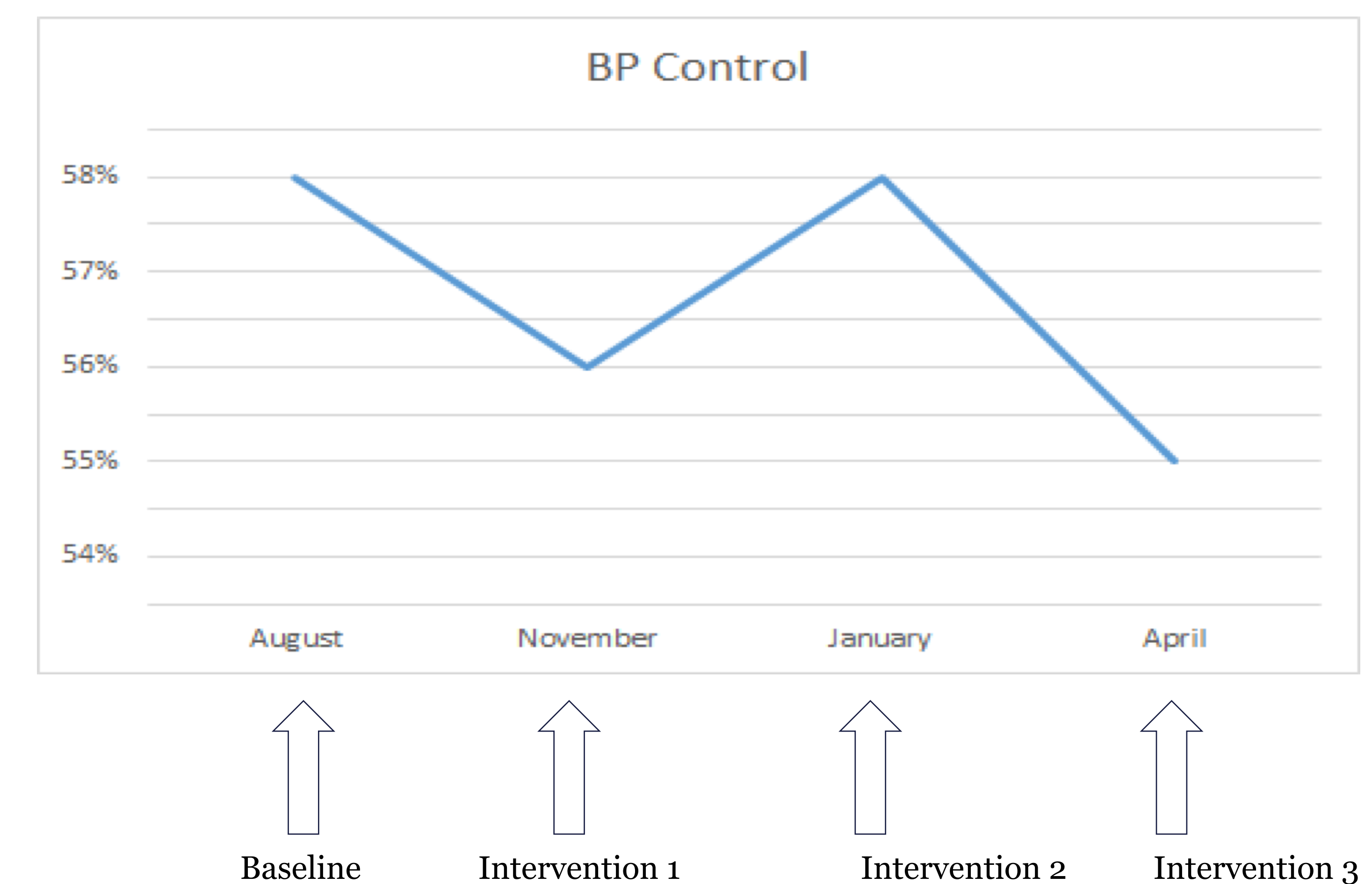


Figure 3. Run Chart: Percentage of hypertensive patients with BP controlled across interventions, 2019-2020

## References

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